

Claims

1. A multi-carrier communication apparatus for transmitting data using a plurality of sub-carriers, comprising:

5 a determining unit which determines a pattern of particular signals associated with first data;

an allocating unit which allocates the determined pattern to sub-carriers of a matrix, the matrix is formed by arranging a plurality of sub-carriers arranged in a direction of a frequency axis in a direction of a time
10 axis;

an allocating unit which allocates sub-carriers modulated by second data to a part of the matrix other than the particular signals; and

a transmitting unit which transmits the particular signals allocated to the matrix and the sub-carriers modulated by the second data.

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2. A multi-carrier communication apparatus, comprising:

a detecting unit which detects a pattern of particular signals associated with first data which are allocated to sub-carriers of a matrix formed by arranging a plurality of sub-carriers arranged in a direction of a frequency axis
20 obtained from received data in a direction of a time axis;

a restoring unit which restores the first data associated with the detected pattern; and

a demodulating unit which demodulates second data from sub-carriers which are modulated by the second data allocated to a part of the matrix other
25 than the particular signals.

3. The multi-carrier communication apparatus as set forth in claim 1 or 2,
wherein each of the plurality of sub-carriers arranged in the direction of the
frequency axis has an orthogonal relationship with a sub-carrier adjacent
5 thereto.